Department of Electrical and Electronic Engineering, UOT.
EE-524/532 Final Examination Fall 2017

0 - 127
128 - 191
192 - 223
224 - 239
240 - 255

Attempt all Questions:

Q1.[5] Which of the following devices can an administrator use to segment their LAN? (Choose all that apply)

A. Hubs B. Repeaters C. Switches D. Bridges E. Routers F. Media Converters
G. All of the above

Ans: C, D & E

Q2.[5] Routers perform which of the following functions? (Select three)

A. Packet switching
B. Collision prevention on a LAN segment.
C. Packet filtering
D. Broadcast domain enlargement
E. Broadcast forwarding
F. Internetwork communication

210.10.2.0/28
NW address
last address

Ans: A, D & F

Q3.[5] How many subnetworks and hosts are available per subnet if you apply a /28 mask to the 210.10.2.0 class C network?

Ans: No. of subnets $= 2^4 = 16$ subnet

Q4.[5] You are a systems administrator and you are about to assign static IP addresses to various servers on your network. For the network 192.168.20.24/29 the router is assigned to the first usable host address, while the last usable host address goes to your server-X. What would you enter into the IP properties box of the server-X?

IP address: Subnet Mask: Default Gateway:

Ans: IP address: 192.168.20.30
Subnet Mask: 255.255.255.248
Default Gateway: 192.168.20.25

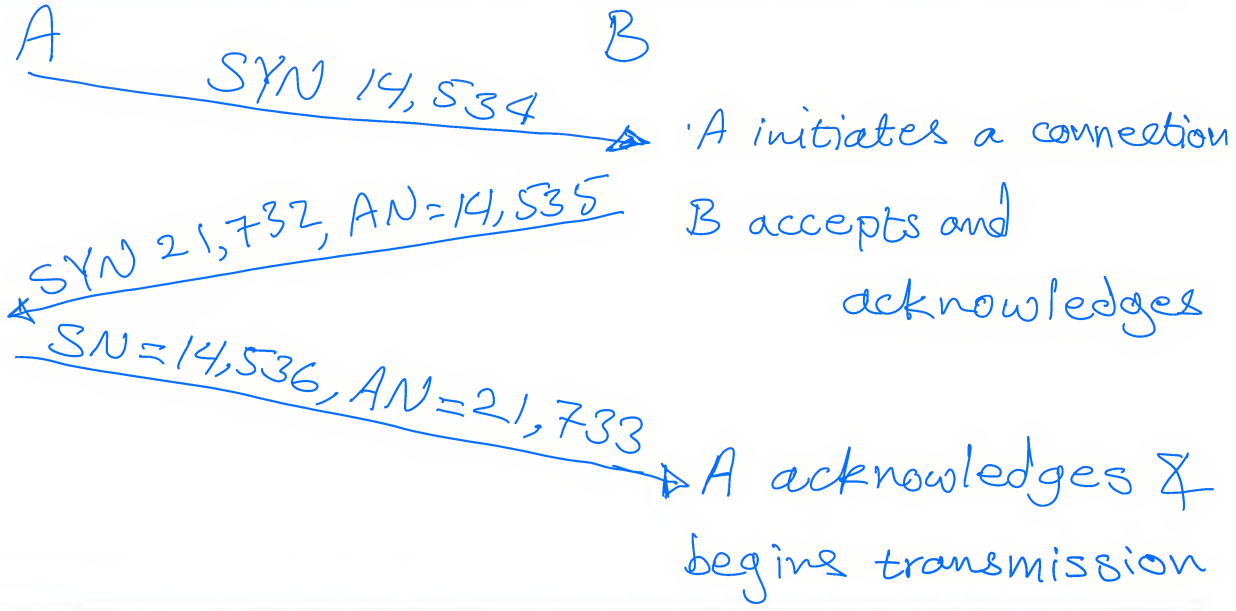
Q5.[5] What is the subnet for the host IP address 172.16.210.0/22? → NW address

255.255.

Ans: 172.16.208.0/22

Q6.[5] TCP opens a connection using an initial sequence number (ISN) of 14,534. The other party opens the connection with an ISN of 21,732. Show the three TCP segments during the connection establishment.

Ans:



Q7.[12] An IPv4 datagram has arrived with the following information in the header (in hexadecimal): 0x45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 0E 0F 02

a) Is the packet fragmented?
b) What is the size of the data?
c) How many more routers can the packet travel to?
d) What is the protocol?
e) What is the source address?
f) What is the destination address?

Ans:

(a) The flags of three bit $= (010)_2$
since the Don't fragment flag = 1 the packet is not fragmeted.

(b) Total length field $= (0054)_{16}$
$= (00000000\ 01010110)_2$
$= 86$ bytes

Internet header length (IHL) $= (5)_{16} = 5$ octets
IP Header size $= 5 \times 4 = 20$ bytes

The size of TCP datagram = total length - TCP header size = total length - IHL x 4

$= 86 - 5 \times 4 = 86 - 20 = 66$ bytes

Assume the TCP header have no options or padding

$\Rightarrow$ TCP header size = 20 bytes

Data size = TCP datagram size - TCP header size

$= 66 - 20 = 46$ bytes

[c] Time to live (TTL) $= (20)_{16} = (0010\ 0000)_2$

$= 32$

It means the packet can travel to up to 32 routers.

[d] Protocol field $= (06)_{16} = (0000\ 0110)_2 = 6$

which means the protocol is TCP

[e] The source address $= (7C\ 4F\ 03\ 02)_{16}$

$= (0111\ 1100\ 0100\ 1111\ 0000\ 0011\ 0000\ 0010)_2$

$= 124.79.3.2$

[F] The destination address $= (B4\ 0E\ 0F\ 02)_{16}$

$= (1011\ 0100\ 0000\ 1110\ 0000\ 1111\ 0000\ 0010)_2$

$= 180.14.15.2$

Q8.[8] A system uses the *Go-back-N* ARQ Protocol with a window size of 7. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 5000 Klm and the propagation speed is 2×10^8 m/s. Ignore transmission, waiting, and processing delays, and ignore the overhead due to the header and trailer.. We assume no data or control frame is lost or damaged.

$$\text{No. of Packets} = \frac{\text{Total No. of bits}}{\text{No of bits in one packet}}$$

$$= \frac{1 \times 10^6}{1 \times 10^3} = 1000 \text{ packet}$$

$$\text{Time to send 1 packet} = \frac{\text{Distance between sender \& Receiver}}{\text{Propagation speed}}$$

$$= \frac{5000 \times 10^3 \text{ m}}{2 \times 10^8 \text{ m/s}} = 0.025 \text{ sec}$$

Time to send all packets = $1000 \times 0.025 = 25$ sec